REMARKS

Reconsideration and allowance of this application are respectfully requested.

By this Amendment, the Specification has been amended to correct minor and obvious typographical errors. No new matter has been added by these amendments.

Claims 33-54 are pending in this application.

THE PRIOR ART REJECTIONS

The Examiner rejected claims 33-36,39-45.47-5153-54 under 35 U.S.C. §102(e) as being anticipated by Shaffer *et al.* (Shaffer) (US 6,236,642 B1). The grounds for this rejection are respectfully traversed.

This invention relates to computer networks, and more specifically to finding improved communication paths through a heterogeneous computer network by means of a so-called *"overlay network."* [*Spec.*, pg. 1, lines 6-9] The overlay network may comprise "a special group of intermediate nodes" through which an alternative path may pass. [*Spec.*, pg. 3, lines 13-22]

So, e.g., when a source wishes to send data to a destination (e.g., in a packet-based network), a path is determined from the source to the destination through various network nodes. E.g., with reference to Fig. 1 of the application (reproduced below), a path from the source 100 to the destination 160 traverses various network nodes 145. Such a path is referred to as a so-called "default path," and is generally determined using existing routing mechanisms. These mechanisms may try to find what they consider to be an optimal path based on some criteria of theirs.
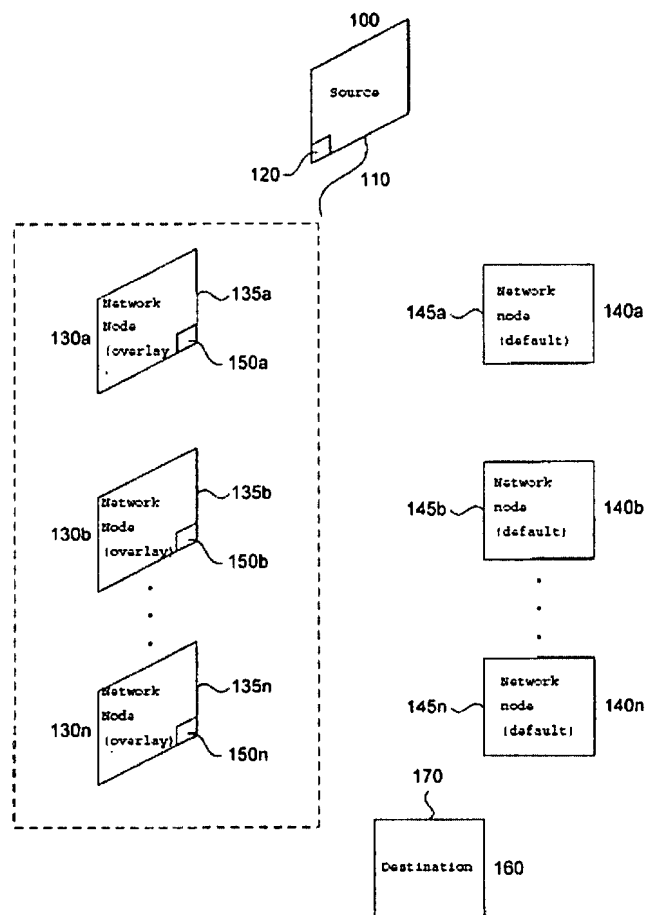
The inventor realized, however, that the path(s) determined by existing routing mechanisms may be sub-optimal for various reasons. For example, the so-called "default" paths determined by existing routing mechanisms may be "old" paths (and therefore possibly no longer "optimal"), they may include recently congested nodes, or they may have been determined using a different measure of optimality than that desired by the current user. (See, e.g., "Because of the great size and heterogeneous nature of the Internet, and the complexity of the routing task, these routing protocols [for the default path] are typically minimalistic and tend to focus on guarantee of connection and minimizing routing hops rather than optimizing performance." [*Spec.*, pg. 1, line 31 *et seq.*])

The present invention solves the problem of inadequate default path performance by providing additional functionality to a special group of nodes,

referred to as "intermediate nodes" or "overlay nodes." As the Specification explains, the overlay nodes "provide additional functionality for exploiting overlay routing." [*Spec.*, pg. 5, lines 32-33]. These overlay nodes create an "overlay network" of "alternate routing mechanisms" overlaid on top of the "existing routing mechanisms" of the underlying network: "[a]n overlay network of alternate routing mechanisms is constructed on top of the existing Internet routing mechanisms to find and exploit available resources." [*Spec.*, pg. 5, lines 12-13] The "[o]verlay network nodes utilize existing network transmission lines and infrastructure ... to create a virtual topology." [*Spec.*, pg. 5, lines 23-25]

The inventor was the first to realize that by providing a so-called *overlay network* – a network of nodes over which some control could be exercised, an alternative (and possibly more "optimal") path from source to destination may be found. (The application makes clear, the "optimized" path is not the best path in a global sense, but simply a path "deemed preferable with respect to selected cost/performance criteria and with respect to a set of identified alternative paths." [*Spec.*, pg. 2, lines 1-4])

The Application gives an example, with reference to Figs. 4A-4B (reproduced below). [*See*, e.g., *Spec.*, pg. 11, line 23 to pg. 12, line 4.]
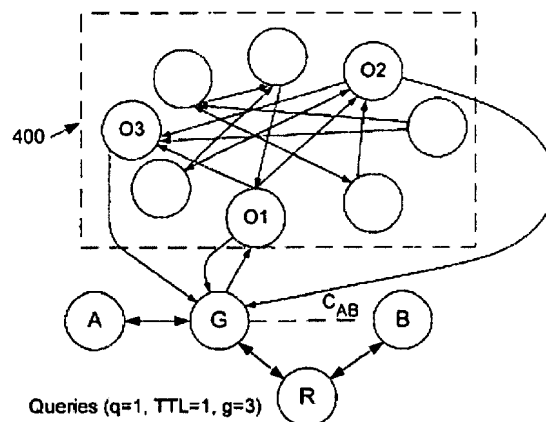

FIG. 4A

As shown in Fig. 4A (above), the *default* path (*i.e.,* the path determined using the existing routing mechanisms) from A to B is via G (a gateway through which A accesses the network) through R (here R is an abstraction of the path). According to the invention, an "optimal" path is sought through nodes of the **overlay network** 400. In this example, each of overlay network nodes O1, O2 and O3 returns a possible path from A to B (via G). As shown in Fig. 4B, one of those paths is selected (in this example, the path through intermediate nodes – i.e., overlay nodes – O1 and O2) to replace the default path. Note that, as in this example, the "optimal" route may include more than one node of the overlay network (here, overlay nodes O1 and O2).
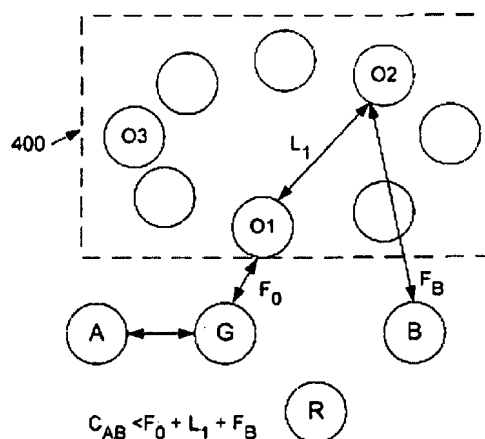

FIG. 4B

Thus, in one aspect, this invention uses one or more nodes of an "overlay" network to find and form an alternative path from a source to a destination in a packet-switched computer-based communications network.

In some aspects, e.g., as recited in independent claim 33, the method of this invention includes: receiving data associated with a request for content at a first intermediate server, the data transmitted from an end user to the first intermediate server, and identifying a first cost of transmission along a default route from the first intermediate server to a content server (e.g., server B in Figs. 4A-4B). The default route (R in Fig. 4A) is determined using one or more existing routing

mechanisms. The method further includes identifying a second cost of transmission along an alternate route from the first intermediate server to the content server, the alternate route including a second intermediate server not in the default route, *wherein the second intermediate server is part of an overlay network* (e.g., node O2 in overlay network 400 in Fig. 4A). The method then determines an optimal route based at least in part on the first cost and the second cost, wherein the first cost and the second cost are determined using network communication performance metrics. Data associated with the request for content are then transmitted along the optimal route.

The invention supports so-called "encapsulation" as a mechanism to bypasses default Internet routing paths. The encapsulation approach is described in detail in the Specification at pg. 12, line 28 et seq. As noted in the Specification:

> By way of background, message packets in accordance with protocols like the IP protocol generally include "source" and "destination" fields. The "destination" field is used by routing mechanisms in the nodes of the underlying communications network (e.g., the Internet) to forward packets toward their intended destination. In a preferred embodiment of the present invention, a technique called "encapsulation" is a primary mechanism by which our system effectively bypasses default Internet routing paths and utilizes optimized, alternative forwarding paths through overlay nodes. Encapsulation substitutes an original destination IP address with a different destination IP address, and records the original destination address in an encoded capsule.

[*Spec.* pg. 12, line 28 et seq.]

The present invention operates transparently, "and does not necessitate changes in underlying network protocols such as IP, or in client application programs that rely upon network communications." [*Spec.*, pg. 19, lines 19-22]

This transparency is a valuable benefit because it increases the applicability of this approach as a practical solution for legacy network-based applications.

As to **claim 33**, according to the Examiner, Shaffer teaches a method for selecting a route in a network, the method comprising:

> ... identifying a second cost ... of transmission along an alternate route from the first intermediate server (i.e. node 1) to the content server (end node), the alternate route including *a second intermediate server* (i.e. node 2) not in the default route (i.e. route "source node - node 1 - node 2 -end node") ..., *wherein the second intermediate server is part of an overlay network (i.e. a network connection is shown in figure 2).*

[*Office Action*, §7, pgs. 3-4, emphasis provided]

Applicant respectfully submits, however that Shaffer neither teaches nor in any way suggests an *overlay network*, let alone one in which an alternate route is taken. The Examiner's only indication of supposed support for an overlay network in Schaffer is the Examiner's remark that "a network connection is shown in figure 2." *Id.* Regardless of whether or not such a connection is shown, figure 2 does not show an overlay network, and *none of the nodes in figure 2 are nodes in an overlay network.*

The Examiner appears to believe that node 2 is an overlay node (see *Office Action*, §7, pgs. 3-4, quoted above, and also, "Shaffer teaches the alternate route (i.e. route "source node - node 1 - node 2 - end node") comprises one or more overlay nodes (see figure 2)." This is incorrect. Shaffer's "node 2" is not in an overlay network – none of his nodes are nodes in an overlay network. Since Shaffer has no overlay network, he does not and cannot have any teaching or suggestion of any intermediate nodes in such a network.

Since Shaffer lacks any teaching or suggestion of the claimed "alternate route including a second intermediate server not in the default route, wherein the

second intermediate server is part of an overlay network," Shaffer does not anticipate or render obvious claim 33. Similar arguments apply to independent claims 42, 47, 53 and 54. The dependent claims are patentable over Shaffer for at least the reasons given above.

Claim 40

Claim 40 depends directly or indirectly from claims 38, 37, 36 and 33, and is therefore patentable over Shaffer for at least the reasons given above. The Examiner believes that since Shaffer shows a path (optimal route), "it inherits [sic] that if the request is transmitted along the optimal route, then the response must be transmitted along the optimal route, too)" This statement is fundamentally incorrect – no such inherency is present in a packet-switched network. Quite to the contrary, it is inherent in packet switched networks that the return path may be along any route determined using default network routing. The present invention describes the use of so-called "masquerading" (see., e.g., *Spec.* pg. 14, line 24 to pg. 15, line 32 and Fig. 5). For example (using the example in Fig. 4B), the last overlay node in the forward path (node O2) would masquerade as the source. Replies from B would thus go to node O2 (instead of to the actual source, A). Node O2 then passes any such replies to A (via the reverse path). To do this, node O2 must retain some information about the actual source, and match that information with any replies received from the destination B that it receives – replies that should really go to A. In the absence of masquerading, the reply sent by node 160 to node 100 would normally follow a return path using default network routing.

For at least these addition reasons, claim 40 is further patentable over Shaffer.

In view of the above, withdrawal of this rejection under §102 is respectfully requested.

The Examiner rejected claims 37-38, 46, 52 under 35 U.S.C. §103(a) as being unpatentable over Shaffer as applied to claims 33, 42, 47 above, and further in view of Matthews et al. (Matthews) (6,084,858).

As noted, claims 37-38, 46, 52 are patentable over Shaffer for at least the reasons given above.

Claim 37

Further as to dependent claim 37, applicant respectfully submits that Shaffer lacks any teaching or suggestion of any virtual topology. A "virtual topology" is a topological representation of overlay network connectivity, i.e., a map of the connections between intermediate nodes (whether or not those connections are physical). And since Shaffer lacks overlay nodes, he does not and cannot teach or in any way suggest a method, as claimed, "wherein the one or more overlay nodes define a virtual topology."

Claims 38-39

Applicant notes that the Examiner rejected claim 39 as anticipated by Shaffer (under §102), but rejected claim 38 (from which claim 39 depends) under §103. Applicant respectfully submits that claims 38 – 39 are not anticipated by Shaffer. Claim 38 requires the data to be "transmitted along the optimal route using encapsulation." The Examiner acknowledges that Shaffer does not teach encapsulation.

As noted above, the invention supports so-called "encapsulation" technique as a way to "effectively bypasses default Internet routing paths and utilizes optimized, alternative forwarding paths through overlay nodes. Encapsulation substitutes an original destination IP address with a different destination IP address, and records the original destination address in an encoded capsule." [*Spec.* pg. 13, lines 1-5.]

The Examiner states that "Shaffer teaches the data is [sic] transmitted along the optimal route .... Besides this, Mathews teaches the data is [sic] transmitted along the route using encapsulation (Col. 1, L. 31-33)." [*Office Action*, §21, pgs. 7-8]

As to claim 39, however, there is nothing in either Matthews or Shaffer to teach or in any way suggest the claimed data "transmitted along the optimal route by changing a destination associated with the data."

In view of the above, withdrawal of this rejection under §103 is respectfully requested.

THE INFORMATION DISCLOSURE STATEMENTS

An Information Disclosure Statement (IDS) is being filed herewith. This IDS includes various additional publicly available documents filed by the parties and/or issued by the Court in the earlier, terminated litigation[1] involving U.S. Patent No. 6,275,470.[2] (The PTO was advised of this prior litigation in Applicant's Response of January 24, 2007).

The Examiner drew a line through document number "K" on page 3 of the IDS filed January 24, 2007. That "reference" was a single page document listed as "Exhibit C Regarding U.S. Patent No. 5,774,660 from Civil Action Case 3:02-cv-03708-CRB." The Examiner gave no reason for not considering that document. That page has a heading "U.S. Patent No. 5.774,660 is material to the Patentability of the '470 Patent" (the '470 Patent refers to U.S. Patent No. 6,275,470, the great-

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[1]   Captioned: *Cable & Wireless Internet Services, Inc. v. Akamai Technologies, Inc.*, No. CV-02-3708 (CRB), terminated November, 2003.

[2]   The present application claims priority from U.S. Patent Application No. 09/916,628 filed July 27, 2001, now U.S. Patent No. 6,778,502, issued August 17, 2004; which claims priority from U.S. Patent Application No. 09/886,966 filed June 25, 2001, now U.S. Patent No. 6,473,405 issued October 29, 2002 which claims priority from U.S. Patent Application No. 09/336,487 filed June 18, 1999, now U.S. Patent No. 6,275,470 issued August 24, 2001.

grandparent of the present application). U.S. Patent No. 5,774,660 (to Brendel), referred to in that document, *was* considered by the Examiner in this case.

The "K" reference is listed in the new IDS as "Chart titled U.S. Patent No. 5.774,660 is material to the Patentability of the 470 Patent, Exh. C to Decl. Of Bestavros In Support Of Defendant Akamai's Opposition To Plaintiffs Motion For Preliminary Injunction, filed 12/02/2002 in Civil Action 3:02-cv-03708-CRB.") The Examiner is respectfully requested to consider that document and to indicate accordingly on the Form 1449 filed herewith. For the Examiner's convenience, another copy of that document ("K") is also enclosed in the IDS filed herewith.

CONCLUSION

Applicant respectfully submits that this application is in condition for allowance and an early action to that effect is earnestly solicited. The Examiner is respectfully invited to telephone the undersigned to resolve any outstanding issues.

CHARGE STATEMENT: Deposit Account No. 501860, order no. **2711-0012**

The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 (missing or insufficiencies only) now or hereafter relative to this application and the resulting Official Document under Rule 20, or credit any overpayment, to our Accounting/ Order Nos. shown above, for which purpose a duplicate copy of this sheet is attached.

This CHARGE STATEMENT does not authorize charge of the issue fee until/unless an issue fee transmittal sheet is filed.

CUSTOMER NUMBER **42624**	Respectfully submitted, By: _____ Brian Siritzky, Ph.D. Registration No.: 37,497
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